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scopical technique, and this is followed by 27 pages on the cell, 147 on the structure of phanerogams, and 44 on experimental plant physiology. The topics are well chosen, the directions clear and explicit, while the numerous illustrations help to make the text still more easily understood.

MORE AGRICULTURAL BOTANY

In preparing a book on "Forage and Fiber Crops in America" (Orange Judd Co.) for the farmer and the student of agriculture, Professor Hunt, of Cornell University, has at the same time rendered a valuable service to botany and the botanists. He has brought together many important structural and economic facts in which the general botanist is interested, but which have been difficult of access, because so widely scattered in botanical and agricultural books and periodicals. Here the botanist will find good, if rather popular, descriptions of the common grasses and other plants used for forage, and such fiber plants as cotton, flax, hemp, jute, ramie, etc. The scientific side of the discussions has been unusually well done, and the botanist is not constantly shocked, as he is too often in books of this kind, by anachronisms in nomenclature and spelling. The illustrations are well selected, and were put in to help the text, and not as pretty pictures to help sell the book. Every picture has its use as fully as every sentence in the text, which is more than can be said of many books, botanical as well as agricultural.

STUDIES IN PLANT CHEMISTRY

Under the title "Studies in Plant Chemistry, and Literary Papers" (Riverside Press) have been collected the papers and addresses of the late Mrs. Helen Abbott Michael. They are of interest to botanists as being among the first of their kind published in this country. They include such titles as "A Chemical Study of *Yucca angustifolia*" "Certain Chemical Constituents of Plants considered in Relation to their Morphology and Evolution," "Plant Analysis as an Applied Science," "The Chemical Basis of Plant Forms," "Comparative Chemistry of Higher and Lower Plants," etc. Of the author and her work Dr. Wiley, of Washington, says: "She was among the very first investigators in this country who began in a systematic way to study the relations of chemical composition to species of plants and to plant growth." And again, "The most important result of her investigations pointed out in a clear way the regular existence of certain classes of chemical bodies in certain species of plants."

Many botanists remember the author of these papers with pleasure as an attractive young woman (Miss Helen C. De S. Abbott) who twenty or more years ago used to be one of the most interested members of the American Association for the Advancement of Science. To a charming personality she added a deep and intelligent interest in the scientific work of the association, especially in chemistry and botany. In the appreciative biographical sketch by Nathan H. Dole, which fills the first hundred pages, we learn much of her life of helpfulness and usefulness, of her marriage, her travels, her scientific and philanthropic plans, and of her untimely death on the twenty-ninth of November, 1904. Her name deserves to be placed high in the short list of scientific women in America, and the botanists especially should remember her as one who wrought well and faithfully in her efforts to add to the upbuilding of a neglected department of their science.

Charles E. Bessey
The University of Nebraska

THE DENSITY OF THE ETHER[1]

1. The theory that an electric charge must possess the equivalent of inertia was clearly established by J. J. Thomson in the *Phil. Mag.* for April, 1881.

2. The discovery of masses smaller than atoms was made experimentally by J. J. Thomson, and communicated to Section A at Dover in 1889.

3. The thesis that the corpuscles so dis-

[1] Abstract of a paper read by Sir Oliver Lodge before Section A of the British Association for the Advancement of Science, Leicester, 1907.

covered consisted wholly of electric charges was sustained by many people, and was clinched by the experiments of Kaufmann in 1902.

4. The concentration of the ionic charge, required to give the observed corpuscular inertia, can be easily calculated; and consequently the size of the electric nucleus, or electron, is known.

5. The old perception that a magnetic field is kinetic has been developed by Kelvin, Heaviside, FitzGerald, Hicks and Larmor, most of whom have treated it as a flow along magnetic lines; though it may also, perhaps equally well, be regarded as a flow perpendicular to them and along the Poynting vector. The former doctrine is sustained by Larmor, as in accordance with the principle of least action, and with the absolutely stationary character of the ether as a whole; the latter view appears to be more consistent with the theories of J. J. Thomson.

6. A charge in motion is well known to be surrounded by a magnetic field; and the energy of the motion can be expressed in terms of the energy of this concomitant field—which again must be accounted as the kinetic energy of ethereous flow.

7. Putting these things together, and considering the ether as essentially incompressible —on the strength of the Cavendish electric experiment, the facts of gravitation, and the general idea of a connecting continuous medium—the author reckons that to deal with the ether dynamically it must be treated as having a density of the order 10^{12} grams per cubic centimeter.

8. The existence of transverse waves in the interior of a fluid can only be explained on gyrostatic principles, *i. e.,* by the kinetic or rotational elasticity of Lord Kelvin. And the internal circulatory speed of the intrinsic motion of such a fluid must be comparable with the velocity with which such waves are transmitted.

9. Putting these things together, it follows that the intrinsic or constitutional vortex energy of the ether must be of the order 10^{33} ergs per cubic centimeter.

Conclusion.—Thus every cubic millimeter of the universal ether of space must possess the equivalent of a thousand tons, and every part of it must be squirming internally with the velocity of light.

THE AMERICAN ELECTROCHEMICAL SOCIETY

THE twelfth general meeting of the American Electrochemical Society will be held in New York City on October 17, 18 and 19 (Thursday, Friday and Saturday of the third week of October).

The meeting will be opened by an evening session on Thursday, October 17. This session as well as the morning session on Friday, October 18, will be held at the Chemists' Club, 108 West 55th Street. The morning session of October 19 will be held in Havemeyer Hall, Columbia University. Headquarters for registering and information are at the Chemists' Club. Hotel headquarters are at the Hotel Cumberland, 54th Street and Broadway.

On Friday afternoon an excursion will be made to the laboratories of Mr. Thomas A. Edison. Mr. Edison will receive the visitors personally. A special car will be provided on the Delaware, Lackawanna & Western Railroad, the train leaving West 23d Street at 2:15. On the evening of Friday a subscription dinner will be held in Liederkranz Hall. Ladies are specially invited.

On Saturday afternoon an excursion will be made to the new Pennsylvania Railroad power plant at Long Island City, the New York Electrical Testing Laboratories and other points or places of interest to be announced at the meeting. On the evening of Saturday a smoker will be tendered to the American Electrochemical Society by the Chemists' Club.

During the meetings there will be an exhibition of some novelties of electrochemical products and apparatus at the Chemists' Club.

The program of papers is as follows:

Thursday Evening

8 P.M.—Reception and session at Chemists' Club.

8:40 P.M.—Illustrated lecture on "Diamond and